

TYPE DESCRIPTION

A. Stand Composition

More than 50 percent swamp conifers with **balsam fir** (*Abies balsamea*) predominant.

B. Associated Species

Northern white cedar (*Thuja occidentalis*), **black spruce** (*Picea mariana*), **white spruce** (*P. glauca*), **tamarack** (*Larix laricina*), **hemlock** (*Tsuga canadensis*), **white pine** (*Pinus strobus*), **jack pine** (*Pinus banksiana*), **black ash** (*Fraxinus nigra*), **paper birch** (*Betula papyrifera*), **yellow birch** (*B. allegheniensis*), **red maple** (*Acer rubrum*), **quaking aspen** (*Populus tremuloides*) and **balsam poplar** (*P. balsamifera*).

C. Soil Preference

Located on peat or muck soils where soil pH is in the range of 4 to 6.

D. Range of Habitat Types

Hydric (wet) site habitat types have not been developed for Wisconsin. Habitat types for swamp conifers were determined for upper Michigan (Coffman et al., 1980) and include TTM (Tsuga-Thuja-Mitella), TTS (Tsuga-Thuja-Sphagnum), PO (Picea-Osmunda), and PCS (Picea-Chamaedaphne-Sphagnum). However, these types are based on very limited sampling and have not been studied adequately to offer extensive management information.

SILVICAL CHARACTERISTICS

For silvical characteristics, see Chapter 34 for balsam fir and white spruce, Chapter 36 for black spruce, Chapter 37 for tamarack, and Chapter 38 for white cedar. In addition, site index curves and pest management guidelines for balsam fir are provided in Chapter 34.

MANAGEMENT ALTERNATIVES

The management objective should be identified within an ecosystem framework, giving consideration to a variety of objectives within the local and regional landscape. A possible objective is to manage for production of the maximum quantity of pulpwood where possible and permissible under wetlands protection restrictions. Management concerns of special importance for lowland forest types include Best Management Practices (BMPs) for water quality, endangered resources, biodiversity, wildlife, and aesthetics.

SILVICULTURAL SYSTEM

Even-age management will be applied with a set rotation length of 50 years on all sites where objectives include harvesting and regeneration.

MANAGEMENT RECOMMENDATIONS

Generally conifer species are thriftier and better producers than hardwood species on peat soils. These sites should be managed to retain, at least, or increase, if possible, the proportion of conifers in the future stand's composition. Strip cutting in swamp conifer will encourage survival of advance conifer seedlings, favor establishment of new conifer seedlings, and allow conifers to compete successfully with hardwood species.

A commercial clearcut in swamp conifer usually leaves 30 to 60 square feet of non-merchantable residual trees. These non-merchantable trees should be removed concurrent with the sale or immediately thereafter to allow full development of the future stand.

Current research indicates that it may be possible to clearcut, burn, and direct seed swamp conifer stands. Balsam fir can also be regenerated by shelterwood cutting on swamp sites. However, the limited volume present and the likelihood of difficult logging conditions usually precludes two-step stand removal.

Incidence of decay in balsam fir decreases as stand density increases. The incidence and extent of decay in balsam fir is also much greater on upland sites than on swamp sites. Natural pruning may reduce infection source by healing over limb scars.

A. Sapling/Seedling Stands (0-5" DBH)

At this stage no treatment is necessary. Simply allow natural development. The adequate moisture of swamp conifer sites allows balsam fir to become established over a wide range of light conditions.

B. Pole Timber Stands (5-9" DBH)

1. Stand without cedar

Do not thin. Clearcut stand at rotation age if stand has vigorous advance regeneration that will provide 60 percent millacre stocking after harvest.

If advance regeneration is inadequate, commence strip clearcutting when stand reaches rotation age. Divide the stand into strips, 2-chains wide, at a right angle to the prevailing wind direction (generally from the southwest). Clearcut the most leeward strip and each successive third strip.

When 60 percent millacre stocking of one-foot tall seedlings has been attained, clearcut the next series of strips windward of the newly regenerated strips.

When the second series of strips has regenerated, cut the third series. Either leave seed trees at 100 ft. spacing or apply direct seeding to regenerate the last series of strips.

As each strip is cut, or shortly thereafter, most residual stems larger than 2 inches DBH should be removed to favor regeneration.

To provide adequate seed bed, bunching or windrowing of slash may be necessary if stand is very dense. In case of heavy slash, burning may be the best method of slash disposal and seed bed preparation.

2. Stands with cedar management potential (containing at least 200 dominant and co-dominant cedar stems per acre)

When the balsam fir component of the stand reaches 50 years of age, harvest the stand leaving 90 square feet of residual basal area. Retain all cedar and other long-lived species such as tamarack and white spruce. Some balsam fir may also be left to bring the residual up to 90 square feet. Thereafter, manage as prescribed for white cedar.

REFERENCES

(Also see reference list for Chapter 34.)

Benzie, J. W. 1963. Research Paper LS-4, Cutting methods in mixed conifer swamps, upper Michigan. USDA-Forest Service, Lake States For. Exp. Sta.: St. Paul, MN.

Coffman, M. S., E. Alyanak, J. Kotar, and J. E. Ferris. 1980. *Field guide to habitat classification system for Upper Peninsula of Michigan and northeast Wisconsin*. Michigan Technological Univ.: Houghton, MI. 144 pp.

Johnston, W. F. 1975. Reproducing lowland conifer forests. *J. Forestry*, vol. 73, no. 1, p. 17-20.

Roe, E. I. 1946. Technical Note No. 261, Extended periods of seed fall of white spruce and balsam. USDA-Forest Service, Lake States For. Exp. Sta.: St. Paul, MN.

Roe, E. I. 1957. Technical Note No. 512, Growth of established balsam fir reproduction greatly stimulated by cutting. USDA-Forest Service, Lake States For. Exp. Sta.: St. Paul, MN.